FAA GENERAL AVIATION NEWS

MAY 1978

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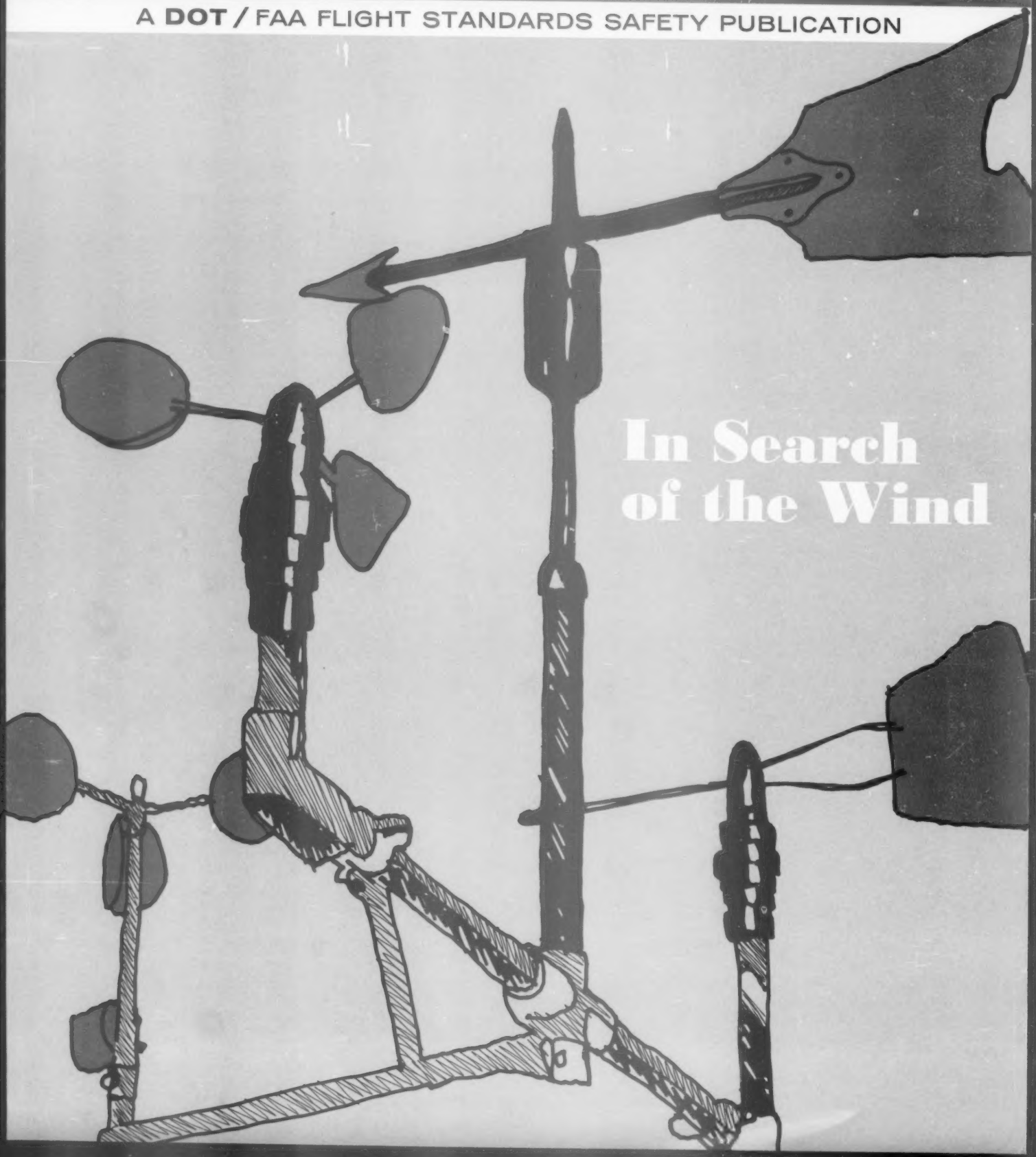

In Search of the Wind

FAA GENERAL AVIATION NEWS

DEPARTMENT OF TRANSPORTATION/FEDERAL AVIATION ADMINISTRATION VOL. 17, NO. 1

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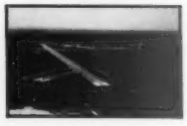

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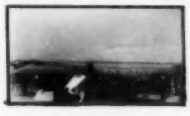

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DIRTY BIRDS

Why "once over lightly" is not enough

After a seemingly endless winter that grounded many a weekend pilot week after week, the return of fine weather has produced an urge to fly again in the heart of every avid birdman. It takes some ingenuity to extricate yourself from the tentacles of a homeowner's spring yard chores and slip out to the airport on a Saturday morning, but if you are dedicated you can manage it.

The airplane is there where you left it, tied down on the grass, and since you had the foresight to have the fixed base operator tune the engine for you recently you know that it is ready to roll—mechanically. The operator did mention that the plane could use a good scrub-down before flying, so you have come armed with bucket and brush, rags, detergent, soap and high resolve.

You observe that the airplane does have a heavy coating of dust and assorted grime, so you determine to give it a complete wash from nose to tail, and you begin with the spattering of mud on the spinner. The sun is still low over the horizon and you have plenty of time. You notice other pilots driving up to the parking lot, dashing over to the tie-down area and hustling some grimey old bird over to the gas pumps, but that is not your style. You want your plane looking as good as you feel.

Two hours go by, and you are just beginning to work on the wings. You've had coffee twice, by this time, the sun is pretty high, and airplanes are rolling down the runway with annoying regularity. As you wipe the sweat from your brow you find your good intentions sagging. A voice within wonders why this airplane clean-up is so

confounded important, anyway. After all, you are not going to show the plane on exhibit, or race it. You just want to stretch your wings a little in the sky after the long winter on the ground. What difference does it make if you wash it *after* the first flight?

A lot of difference, maybe. An airplane wash job is more than aesthetic—it's therapeutic as well. Also diagnostic. The question is not "whether" but rather "how often." And although there is no single answer for all airplanes, one time you should never skip the bird bath is in the springtime.

The question, how often should you wash your airplane, is about as difficult to answer as how often should you wash your hair. It all depends on the conditions. If you live and fly on a high plateau in Tibet, or on a desert in Arizona, the answer might be once a year—or two. If you are based in or near an industrial or coastal area, once a day might be a good idea. Although there is nothing wrong in washing an airplane for the sake of sprucing up its appearance, the more important reason is the prevention of corrosion.

Washing not only removes dirt and chemicals which favor corrosion, but it also enables you to see just how well your paint job is holding out. Paint is the outer skin of the airplane. Although no more than a few millimeters thick, it stands between your aircraft and the forces of nature which are constantly seeking to reduce it to its original organic state. Keeping the skin intact and the corrosion out is akin to keeping infection out of the human body.

All metals corrode, more or less rapidly, when exposed to corrosive elements. *Direct* or *chemical* corrosion, takes place when metal is exposed to a caustic liquid or gaseous agent. An example would be spillage of battery acid or undiluted cleaning agents on airplane metal. Less obvious chemical agents are found in the air near the seashore and wherever significant quantities of industrial pollution are present. In many areas of the country, where dampness and smog are prevalent, daily wipe-downs are recommended, and a thorough wash may be needed once a week. The dry climate in the inland states west of the Rockies has always been favorable to airplane longevity, but a growing presence of impurities in the air is now noticeable in that region, and indicates a need for protection against corrosion from atmospheric causes.

Galvanic corrosion is also a source of trouble to airplanes. This is brought about by the exchange of electrons taking place between two dissimilar metals. An obvious example would be the corrosion that occurs if copper fastenings were used on steel structures. Great care is taken to make certain that dissimilar metals are never in direct contact in airplanes. Indeed, even slightly different types of aluminum alloys are considered sufficiently dissimilar as to constitute a corrosion risk. Aluminum alloy rivets are color-coded and punch-coded to make certain that they are metallurgically compatible to the structures they support.

Inside clean-up includes inspection of glass, light bulbs and switches. This is also a good time to throw out accumulated litter and make sure the logs and charts are all current.

Nevertheless, it is a fact that an airplane contains steel, copper and brass parts as well as aluminum alloys. When a pathway is created for electrons to travel from one such part to another, corrosion can take place. Water is capable of providing such a path once the protective outer coating of the metal (paint, cladding, etc.) is damaged. Hence the importance of frequent cleansing, which increases the durability of paint and also enables the airplane owner to observe weaknesses in the outer skin that would otherwise be obscured by dirt, oil, grease, etc.

Once the outer skin has been pierced, corrosion can travel extensively underneath. Many kinds of dirt, of course, contain metallic salts which can react directly with the metallic skin or structure of the airplane. The corrosive process may be slow, and largely invisible at the surface, but it could lead to an unsuspected inflight failure.

All rubber parts on the aircraft, including the tires, are very susceptible to deterioration from the various hydrocarbons that are always found around airplanes—especially fuel, oil, and hydraulic fluids. Natural rubber tends to break down more rapidly than synthetic rubber, but the lifespan of all rubber is extended by regular cleaning.

The rubber, metal or fabric parts of an airplane respond very well to ordinary cold water and detergents (soap tends to leave a film). Use a brush that scrubs without scraping or tearing, and use plenty of clean water for rinsing.

Plastic windows need special care, since they are easily scratched. Regular window sprays and cleaners should never be used; gasoline, alcohol, benzine or acetone must also be avoided, as many plastics are solvent in them. If you cannot obtain *plastic window cleaner*, mild soap and water will do. If you use a cloth, take care that it is free of dirt or grit at all times, or you may find yourself peering through a maze of scratches in your windshield.

Incidentally, trying to dust off plastic windows with a dry dust cloth can be a totally frustrating experience. The friction tends to build up an electrostatic charge, which attracts even more dust—washing is the only way to go.

Airplanes unquestionably are hardy creatures, since they spend most of their lives exposed to all kinds of weather and usually seem little the worse for it, save for a gradual dulling of paint and bright parts. Just the same, a really thorough spring cleaning would literally be a lifesaver, if your scrub job happened to disclose a case of advanced corrosion. Pilots who really care will tell you that an airplane flies the way it feels, so why not keep it looking good? ■

THE ENGINE DOCTOR

The Case of the Vanishing Fuel

OWNER: *Well, Doctor, I'm told you're the engine wizard of west Texas, so I wonder if you can figure out what's wrong with my* Arrow. *I'm not getting anywhere near the range the book says I should and worse yet, the fuel consumption varies so much from one flight to the next that I don't know how to plan. For instance, I make regular trips from Midland to Albuquerque, almost every week—my head office is located there, you know—and for that little two-hours plus trip I may use anywhere from 20 to 32 gallons of gas. I hope that doesn't mean the engine is wearing out. It's only got about 800 hours. The dealer I bought it from back in Biloxi said it was in really good shape, and I'd like to think he was a friend of mine.*

DOCTOR: Let me get a little history. Has the fuel consumption always been that erratic, or did it just start?

OWNER: *It's always been a little unpredictable but it seems much worse in the last month or so. I guess I only began to worry about it since I moved here in March and started making that regular trip to Albuquerque every week. It's only 600 miles, round trip, and the book says I ought to get about 850 miles on a full tank cruising at 75% power, but Doc, if I don't refuel at Albuquerque, I come back pretty light.*

DOCTOR: Hmmm. Seems like a checkup is in order. Might be nothing serious, and then again. . . . How does it run?

OWNER: *It runs smooth—except when I fly over the mountains, and everybody knows airplanes always go into "automatic rough" over water and mountains, so that's probably my imagination. As for a checkup, that was the first thing I thought of, so I had the annual done early, just to be sure. It all checked out okay—carburetor, mags, plugs, everything. Plugs had a little lead on 'em but they cleaned up good. Mechanic said there was nothing wrong that could affect the gas consumption—nothing, period. I even wondered if I was getting bad fuel—too low octane or something—so I asked around, but nobody else at my airport has had any problems. It worries me because I don't feel comfortable in a sick bird. Can you suggest any special lab tests?*

DOCTOR: Maybe later—but first I want to examine your method of operation, if you don't mind.

OWNER: *Oh, come on, Doc. I've got a couple thousand hours of left-seat time and never had a problem with an airplane before. Ask the operator at Biloxi. I learned to fly there—soloed in six hours—and got most of my time in his airplanes. Never bent any metal, never had an acident. And I never had any trouble transitioning to this retractable, if I do say so myself.*

DOCTOR: I'm not questioning your flying ability, just wondering about your procedures. For example, what power settings do you use en route to Albuquerque? And what about your altitude profile?

OWNER: *I always cruise at about 70% of power, even though they say it's okay at 75%—I like to be nice to my engine. I go at 23 square (2300 rpm, 23 inches of manifold pressure) most of the time. And the altitudes—they don't vary much either. I start out about 4,000 feet MSL, edge up to 6500 around Roswell, and on toward Soroco. I finally get up to 8500 while I skirt the south end of the Manzano range. That's a little out of my way, but it's such an easy flight up the Rio Grande valley. Once in a while, if it's early enough in the day so the air is smooth I'll go up and over the mountains, that takes about 10,500 feet. That's funny too. Instead of taking less gas to fly higher, I generally use more.*

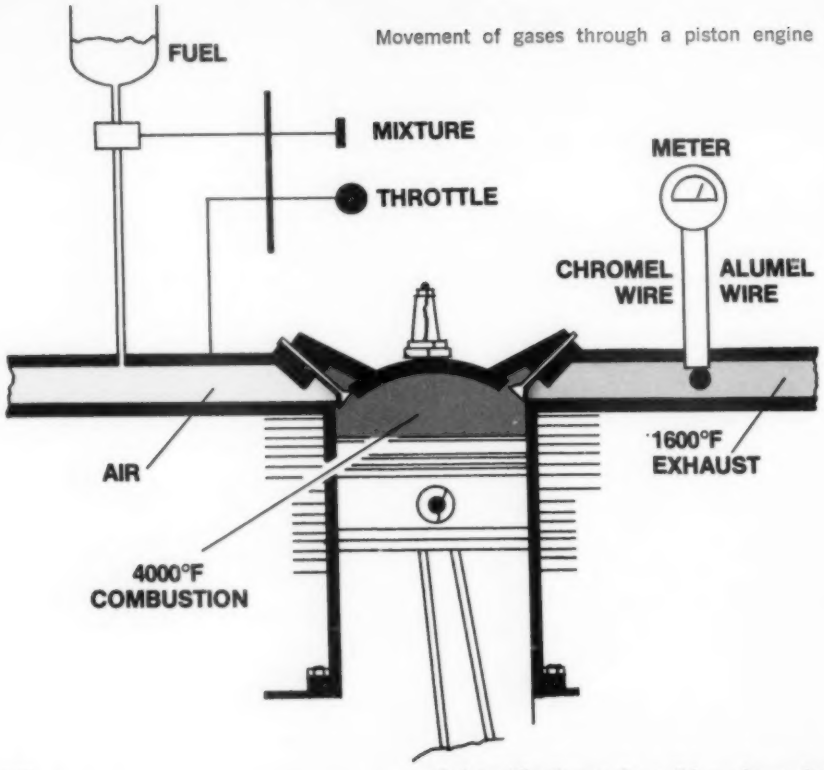
DOCTOR: I see. Now tell me, how do you make these altitude changes—by "stair stepping" at fixed points?

OWNER: *Well, no, just a gradual steady climb till I hit the Rio Grande.*

DOCTOR: Aha! And what about the mixture—do you make frequent adjustments?

OWNER: *Not when I'm climbing, of course. I always lean when I get up to my maximum altitude. Of course, I always run full rich in a climb, or cruising below 5,000, like you're supposed to.*

DOCTOR: What makes you think you're not supposed to lean at cruise below 5,000



Movement of gases through a piston engine

feet?

OWNER: *My instructor taught me that years ago, when I first learned to fly.*

DOCTOR: I am afraid that is a very much misunderstood instruction. "Never lean below five" is good advice when referring to takeoff or climb power, certainly. But nowadays, at least, the engine manufacturers are telling you that with a normally aspirated engine at cruise power—which can be anywhere from 55% to 75% of full power—you should adjust the mixture for any significant change in altitude or power setting. This saves fuel and keeps the engine running cleaner.

OWNER: *At any altitude? Even at 2,000' or 3,000'?*

DOCTOR: I've done it at 1,000' and got improved performance. Why not?

OWNER: *I heard you could get detonation. . . .*

DOCTOR: Not if you follow manufacturer's instructions. Know your power settings—that's the key—they are all in the Pilot's Operating Handbook. Be sure the rpms are where they belong—and the manifold pressure, with a constant speed propeller like yours. In any case, if you climb steadily in your *Arrow* for most of the trip to Albuquerque, without leaning en route, you can expect to waste a ton of fuel. You might be able to save about ten percent out of a full tank by going to 8,500' early, leaning the mixture properly, and cruising at that altitude.

OWNER: *You don't say?*

DOCTOR: I do. Incidentally, when your old instructor cautioned you about never leaning below "five" was he talking about density altitude or MSL?

OWNER: *I don't remember. MSL I think. Does it make any difference?*

DOCTOR: Considerable. For example, you are going to be flying out of Midland, which is at nearly 3,000', this summer when the temperatures are around 90° F. That could give you a density altitude of over 6,000', which means that your engine is very likely to be running a little rough or giving you less than normal power if your mixture is at full rich on takeoff, and while you are climbing.

OWNER: *I never heard of taking off or climbing at less than full rich.*

DOCTOR: You are hearing it now. Lycoming, who makes your engine, recommends that before taking off from any airport where the altitude is above 5,000' density altitude, you lean maximum rpm to the point where the engine runs smoothest—or by reference to the fuel flow meter if you have one. Naturally this does not apply to turbocharged or supercharged engines, which always are on full rich at takeoff.

OWNER: *Naturally.*

DOCTOR: Now suppose you describe for me your leaning procedure.

OWNER: *Standard procedure, Doc. Ease the mixture control knob back until the engine gets a little rough, then push it in until it gets smooth. Tell you the truth, I get edgy when the engine even acts like it is going to run rough, so I usually stop leaning just short of that point.*

DOCTOR: Oho! I suspect we have uncovered another root of your problem. With your tried-and-true method of leaning you are probably in the habit of feeding your little bird an overly rich diet, which leads to an inefficient performance and perhaps some other complications which have not yet surfaced.

OWNER: *I still think it's the fuel. I never had any trouble before I came out to Texas.*

DOCTOR: Perhaps. But I think your problems simply became more prominent here because we have higher and more varying terrain, which calls for more frequent and accurate mixture adjustment. Stopping short of a distinct engine response makes it impossible to lean accurately, especially without cylinder temperature or EGT gauges. What you experienced as "automatic rough" over the Manzano range was probably the result of an overly rich mixture. No telling how much unburnt fuel you are blowing out of your exhaust. Do you know what the difference is in fuel consumption, at cruise, between full rich and optimum leaning?

OWNER: *A few miles per gallon, I guess.*

DOCTOR: I've heard reports varying from 15% to 25%. Lycoming, for example, says that their higher horsepower engines use about three and a half gallons more per hour without leaning. They say that in a *Cardinal* that will cost you one hour of flight time from a full tank.

OWNER: *That much? That is considerable. But I still hate the idea of leaning till I get a rough engine or a bunch of detonation.*

DOCTOR: I think you are unduly worried because the word "leaning" has several different meanings. Let's back off a little and consider the basic situation. You know that your engine burns air and fuel in a proportion of approximately 15 to 1, by weight. When we achieve the optimum mixture we get what is known as a chemically correct combustion—or a clean burn. Virtually all of the oxygen and fuel are consumed, and all of the available energy is released. For any given engine this ideal proportion is the same at any altitude. However, with increases in altitude the density of the air is reduced, and the proportion of fuel is enriched. That produces an overly rich (or chemically incorrect) mixture and eventually a loss of power. We can compensate in one of two ways: by supercharging or turbocharging the engine—which compresses the air, so that the proper mixture is automatically maintained for us—or by what is popularly known as "leaning."

Now, leaning in this sense simply means pulling back on the mixture knob to reduce the rate of fuel flow to the carburetor or the cylinders. You "lean" during cruise to achieve the chemically correct combustion—no more. For your type of engine there is no point in achieving a "lean mixture," that is to say, a less-than-ideal proportion of fuel. This could lead to some engine problems under certain circumstances.

OWNER: *That's what bothers me about leaning to roughness, before smoothing it out.*

DOCTOR: I don't think you can go wrong by following your Pilot's Operating Handbook, and that is exactly what it tells you to do. You see, with small engines, and with practically all carburetor equipped engines, fuel distribution is never exactly even. One cylinder will usually reach its lean mixture limit before the others, and start misfiring—which produces roughness. But this is not the same as detonation, and normally the engine will not stop. Even if it should, from overzealous leaning, pushing in slightly on the mixture control should restart it immediately.

OWNER: *Why don't we want to have a chemically correct mixture on takeoff or climb, then? Or do we?*

DOCTOR: No, we do not. Because the chemically correct combustion achieves peak temperature for a given power setting—about 4,000° F. at maximum cruise power. At full power the temperatures would be far higher—about 6,000°, this would damage the engine, so at higher-than-cruise power settings we always keep the mixture on the rich side of the ideal proportion—full rich, for takeoff below "five." It also happens that you get maximum power slightly on the rich, or cooler, side of your chemically correct mixture. You can observe this on our chart.

OWNER: *Do you mean, the leaner the mixture the hotter the burn?*

DOCTOR: That is true, up to a point. Remember too, the unburnt fuel in a rich mixture serves to help cool the engine.

OWNER: *Then why bother to lean the engine at takeoff on higher altitudes?*

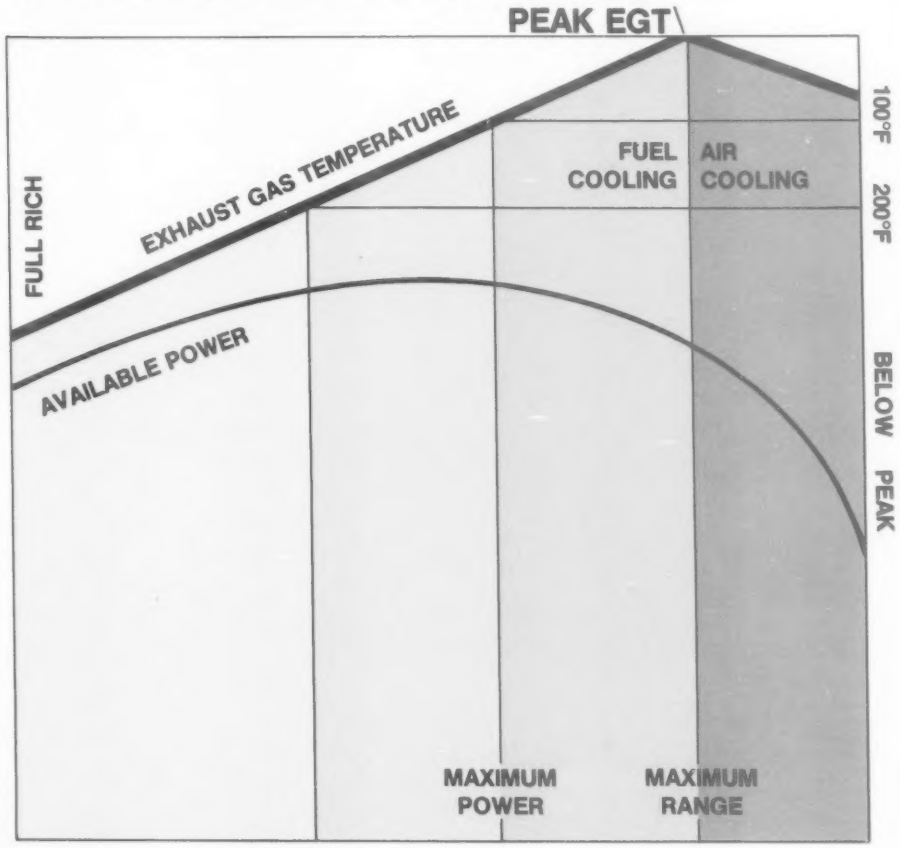
DOCTOR: Because if you exceed the rich tolerance limit you lose power, which you may need for a safe takeoff. You may also get misfiring and possibly fouling of the plugs. You should know what rpms to expect, and be alert if you see them falling off. Ease the mixture out until they come back to normal, and then ease it in slightly.

OWNER: *It seems to me that there ought to be a more scientific way of doing it. Aren't there any gauges that will help?*

DOCTOR: There are temperature gauges, and they do help, within certain limits. We'll get into that next time you come in. Meanwhile, I suggest you go out in your airplane and put a few of the ideas we discussed into practice. See if your fuel consumption doesn't go down. Next, please.

(In the next issue, the Engine Doctor will discuss cylinder head and exhaust gas temperature gauges, and their role in fuel management and engine maintenance.) ■

Power and range plotted against exhaust gas temperatures. Test data, supplied by Alcor, represents single engine performance at 65% power at 10,000 feet.



RX for clean idling.

Spark plugs may become prematurely fouled as a result of the idle mixture setting becoming excessively rich or lean. To check, after landing run up to about 1,900 rpm to clean up the cylinders, then reduce to 600 rpm and lean carefully. The rpm should increase about 25 rpm and then drop off sharply. If the increase is much greater, mixture is too rich; if no increase, too lean. Refer to a mechanic for adjustment. Before shutting down, first run the engine at 1,200 rpm, before pulling out mixture to cutoff point. Avoid extended slow idling.

Lycoming and Continental light engines

(See Pilot's Operating Handbook for individual aircraft.)

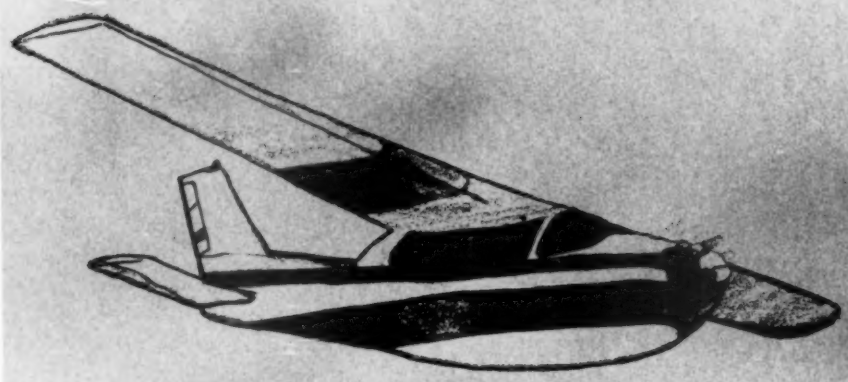
Leaning recommendations, direct drive normally aspirated engines, (carburetored or fuel injection):

1. May be leaned at any altitude, at manufacturer's recommended cruise power (75% or less).
2. In climb from sea level through 5,000′ d.a., mixture must be full rich. For continued climb above 5,000′, mixture may be leaned for smooth engine operation.
3. Operations at higher than 75% power without reference to fuel flow, cylinder head temperatures, and without knowledge of specific power *require full rich mixture.*

Landings and takeoffs above 5,000′ d.a.

1. **Fixed pitch propellers.** Lean to maximum RPM at full throttle prior to takeoff. Limit operation at full throttle on the ground to a minimum.
2. **Direct drive normally aspirated engine with prop governor but without fuel flow or EGT.** Set throttle at full power and lean mixture at maximum RPM with smooth operation as a deciding factor.
3. **With fuel injection.** Set mixture in accordance with instructions on fuel flow gauge and/or in accordance with the airplane Pilot's Operating Handbook.
4. **Pressure carburetor.** Engines with an automatic mixture control do not require leaning for takeoff.
5. **Turbocharged and supercharged engines.** All takeoffs must be a full rich mixture, because the engine is brought back to sea level horsepower which does not permit leaning.

The Last Mile



Coping with wind shear at airports

At 17 minutes after eleven, on the night of December 12, 1976, a DeHaviland *Twin Otter* was approaching Cape May County Airport, on the southern end of the New Jersey "Gold Coast." This was to be the final stop of a flight which had originated in Philadelphia as a segment of a scheduled passenger flight. Because of the rain, fog, and low ceilings prevailing over the area on this night, the aircraft had been unable to carry out a landing at the previous scheduled stop, Bader Field, N.J., and after executing a missed approach at Bader had landed at Atlantic City Airport, where a full instrument landing system was operating.

After discharging five passengers, the *Twin Otter* had been cleared by Atlantic City approach control for an IFR approach to Cape May County Airport. The airport is located on the narrow tip of Cape May, with Delaware Bay to the west and the Atlantic Ocean on the east. The IFR approach is a non-precision (VOR-DME) approach to runway 23-5 from the Sea Isle VORTAC, which is about eight miles north of the airport.

At 11:15 p.m. the airline's station manager at Cape May, who is an official weather observor, contacted the aircraft and reported: Sky—obscured, ceiling indefinite 400 ft; visibility—one mile in fog; wind 250° at six knots. He noted that the ceiling and visibility were decreasing and asked the captain, "Are you sure you want to give it a try?" The reply was in the affirmative.

The aircraft apparently proceeded along radial 234 from the VORTAC until the airport was sighted, and then a circling approach was begun to runway 19—which is equipped with a VASI (visual approach slope indicator lights). Normally the circling approach

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is begun when the MDA (minimum descent altitude) is reached, or about one mile from the runway threshold, after the airport is in view.

As the aircraft was continuing the approach, the station manager went outside of the terminal building and saw that the weather was worsening. Fog was rolling in over the roof, the ceiling was down to about 200 feet, and the visibility about ½ mile. He did not pass this information on to the aircraft, however, because the flight was already on final approach and, in his opinion, the Federal Aviation Regulations would permit the approach to be continued as far as the MDA, at which point the pilot-in-command would determine if weather conditions were equal to or better than the prescribed minimums. At 11:26 he heard two small "explosions" north of the airport, and shortly afterwards he was notified that the airplane had crashed. Four of the ten persons on board died, including the first officer.

The National Transportation Safety Board, which investigated the accident, determined that the probable cause was the flight crew's lack of altitude awareness during a circling approach, which permitted the aircraft's flight path to "deviate below a safe approach profile." The Board concluded that the crew failed to recognize the "deviation" in part because they were depending upon visual references, which were uncertain because of fog, and in part because excessive forward loading of the airplane resulted in nose heaviness.

Another factor was mentioned which could have played a critical role in the pilot's inability to avoid crashing into the ground: *wind shear*. On this same evening, at nearby Atlantic City Airport, an FAA *Aero Commander* made a number of instrument approaches to runway 13 to collect data for a program studying wind shear at airports. Precise measurements were made at regular intervals, during the approaches, including ambient temperature, relative humidity, wind direction, and wind speed. The last approach in the series was made at approximately 10:49 p.m., 37 minutes before the Cape May accident.

An analysis of this data convinced investigators that wind shear was present at low altitudes and that it was associated with a warm front that was moving rapidly northeastward through the area. The front was calculated to have passed across Cape May at 11:40 p.m. Therefore the Safety Board concluded that wind shear conditions similar to those recorded at Atlantic City also existed at Cape May, in greater magnitude and at lower altitude.

Wind shear, a disturbing phenomenon in that it is invisible and unpredictable, is defined as any abrupt change in wind speed and/or direction in a short distance. The principle contributing factor is a variation in air temperature. Typically, when a current of warmer air passes over a body of cool, calm air, a zone of shear may be formed where the two air masses meet. Under some circumstances such as formation of a cold front, turbulence may occur, forming swirling eddies of wind, or wind shifts, in all directions. If made visible by smoke, this turbulence looks something like freshly sheared wool—which gives rise to the name. Aircraft encountering this kind of shear may experience a succession of up or downdrafts, reductions or gains in headwind, or various combinations of wind shifts which will disrupt an established flight path. Wind shear may occur at any altitude with unpredictable direction and duration, but its occurrence at low levels near airports has had the most serious effect on aircraft.

Serious accidents have occurred at major airports in all sections of the country, as well as abroad, involving all types of aircraft from four engine jets to small general aviation trainers. The most catastrophic accident of this kind took place at JFK Airport in New York, on June 24, 1975, when an Eastern Airlines B-727 crashed and burned on the approach to runway 22L, resulting in 112 fatalities.

The appearance of a weather front in the distant sky should alert pilots to the likelihood of wind shear materializing around the airport.

In the Cape May accident, the wind shear apparently consisted of a diminution of headwind with altitude—in the order of about five knots per 100 feet of altitude reduction. Investigators concluded that the aircraft, upon encountering such a wind shear, would have tended to pitch nosedown to maintain its trimmed airspeed, resulting in a faster rate of descent and a steeper descent angle. To counteract this attitude change the pilot would either have had to progressively increase the noseup pitch trim, or exert substantial back pressure on the control column and add power to control the airspeed and rate of descent.

Because the aircraft had been improperly loaded, with the center of gravity 4.6 percent forward of the balance limits, the back pressure required to counteract the wind shear would have been stronger than the pilot could have anticipated. Coupled with the ground fog and the crew's apparent failure to monitor the panel instruments

Intersection of Runways 23 (left) and 19 at Cape May Airport. VOR-DME approach is to 23, but VASI lights are only on 19, requiring a circling approach after the runway is sighted.

effectively during the descent, while seeking to locate the runway visually, the combination of conditions led to the fatal off-airport landing.

To help pilots cope with unexpected wind shifts at airports, FAA has developed a Low Level Wind Shear Alert System, which is currently being tested at half a dozen locations in the United States. These are: Tampa Int., Oklahoma City (Will Rogers), Houston Int., Denver (Stapleton), Atlanta (Hartsfield), and New York (JFK). A seventh installation will be made at Boston's Logan International Airport in mid-summer.

The heart of the problem at airports is that the wind speed and direction, as supplied by the control tower to pilots, is ordinarily measured at the center of the main runway, or perhaps at the tower itself. With runways extending as far as half a mile from dead center, wind shear at the runway ends could create very different wind conditions from those being reported, and call for very different descent and approach patterns. Furthermore, wind shear could produce significantly different conditions a few hundred feet above the runway from what is being experienced at the surface.

FAA's new alert system consists of one centrally located anemometer (a sensing device for windspeed and direction) and five others positioned strategically around the airport and mounted 20-50 feet above the ground. Output from the anemometers is fed continuously into a small computer in the tower, and the average individual readings from each remote instrument is automatically compared with the reading from the centrally located anemometer. When the vector difference between these inputs exceeds a given level, the data are displayed on a screen, and audio and visual alarms draw attention to it. The local controller will then advise inbound/outbound aircraft as appropriate. An advisory might read:

Eastern 731, caution wind shear conditions. Centerfield wind, two six zero at one zero. South boundary wind, one seven zero at two five.

The pilot of the approaching aircraft might then decide to ask for another runway, to modify his descent pattern, or perhaps even go around and reconsider. At any rate he would be forewarned to expect wind conditions on his approach that are very much at variance with those available from a single reporting instrument. If this system succeeds in preventing wind shear accidents, it will be installed at other major airports.

But for the general aviation pilot who uses the smaller airports primarily, the problem remains largely one for self-determination. Although the shear can sometimes be more of a problem with large airplanes, because of inertia, than with small craft, the majority of wind shear accidents occur in general aviation. Over the 24 month period 1975-76, the Safety Board identified 19 accidents known to involve wind shear. Involved were two air carriers and 17 general aviation aircraft, including two rotorcraft (one air taxi, one homebuilt) and an ex-military jet. Of these 19 accidents, 13 took place during a landing operation, four on takeoff, and two in other phases of flight. Most were in VFR weather.

Unpredictable as the wind is, there are certain conditions and indications which bear watching. Wind shear is usually associated with one or more of three conditions:

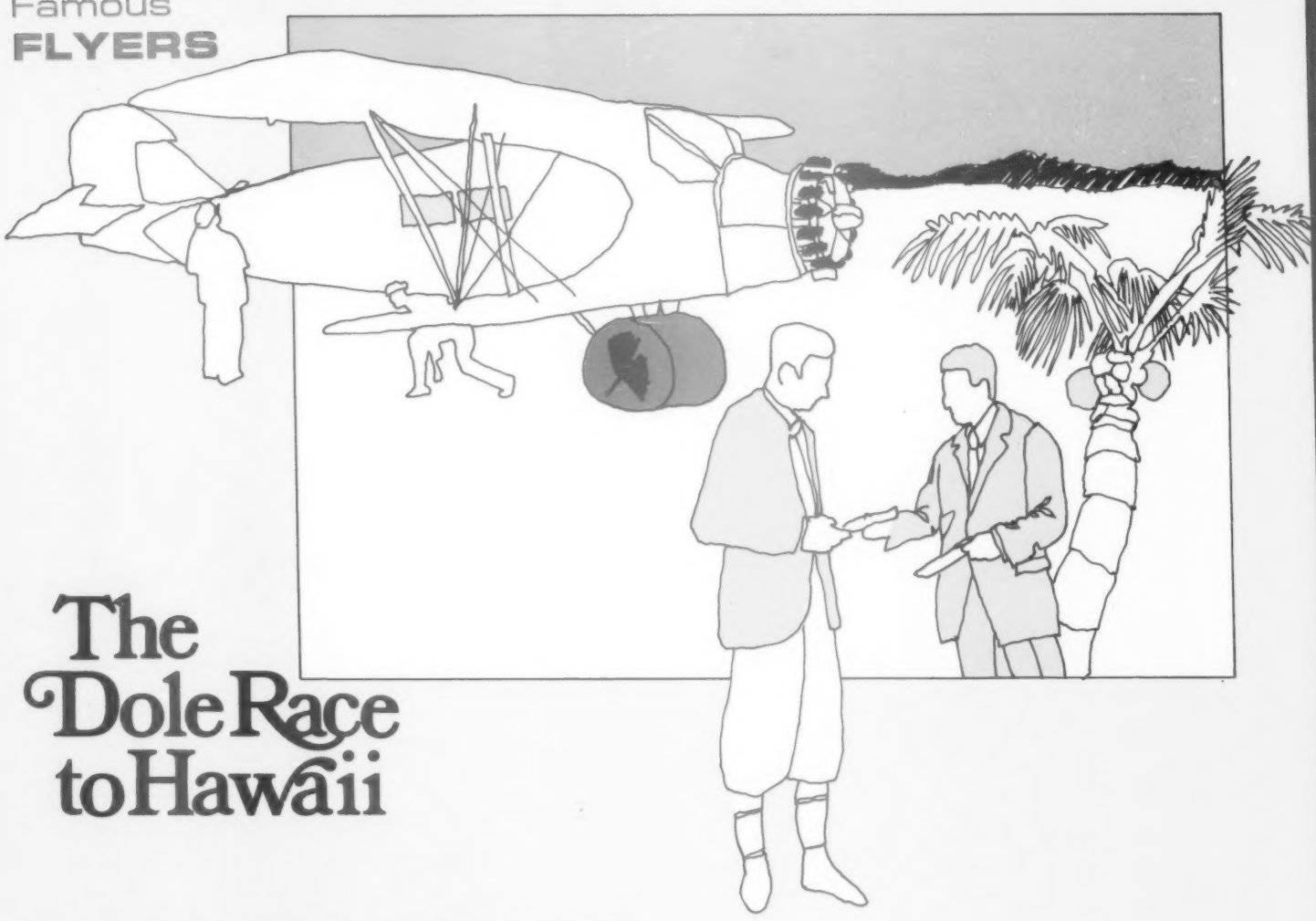
- **Thunderstorms.** Major wind shifts, strong headwinds, tailwinds and/or downdrafts can be expected in the area beneath the base of the storm and as far as 10 to 15 miles distant.
- **Warm and cold fronts.** Considerable shear can be expected when there is a temperature change of 10° F. or more across the front, and/or the front is moving at a speed of 30 knots or more. The Weather Service can usually tell you the relative speed and movement of the front surface above your airport, so you can be particularly cautious when you pass through that level.
- **Mountain ridges.** In general, the sharper and higher the ridge, the more severe the potential wind shear from one side to the other. Lengthy updrafts (windward side) and downdrafts (leeward side) are common. (In a recent accident in North Carolina, an aircraft attempting to cross over the Appalachians with a clearance of 1,000 feet, from east to west, aparently became caught in a downdraft and crashed into the side of Mt. Mitchell.)

Other indications: there are some airports which seem to have built-in wind shear producers of one kind or another. Clumps of tall trees along side the runway are one example. A runway with an abrupt drop-off at the end or threshold, especially in high country, is always suspect. Notice the relationship between winds aloft and surface reports. If there is a 40 knot wind at 3,000 feet and a dead calm on the ground, be alert for a significant wind shear on your way down. Likewise, if your destination airport is reporting very light winds and an airport a few miles away has 30 knots at the surface, you can be sure the wind is changing somewhere in between; it may be on your final approach. Smoke that goes up straight from a chimney some distance and then bends over at a right angle is another give-way clue.

To guard against the effects of a wind shift on final approach, avoid coming in at low altitude and airspeed carrying power all the way to the roundout will enable you to be more responsive to sudden wind changes. If you encounter a downdraft on final, concentrate on maintaining a proper attitude and airspeed. Use pitch and power as needed to establish control, and keep flying the airplane all the way down. Wind shear has a nasty habit of striking just when you think you've got it made—especially along that last mile to the field.

You are not able to see the windshift, but you may feel it kinesthetically (through the seat of your pants). Sit tight, and fly right. ■

Famous
FLYERS



The Dole Race to Hawaii

The wildest air derby of them all

In the annals of aviation history, 1927 has become a major benchmark, the year of many flights and many records. The fact that an unknown airmail pilot could fly from New York to Paris opened up the skies to a fervor of competitive record-setting.

Lindbergh, who conquered the Atlantic by flying from New York to Paris on May 20-21 for the $25,000 Orteig Prize, was followed two weeks later by Chamberlin, who flew nonstop to Berlin for a distance record of 3,905 miles.

Interest in flying over the Pacific was also stimulated, especially after the publication of the following announcement in the Honolulu Star-Bulletin on May 25, 1927:

"James D. Dole, believing that Charles A. Lindbergh's extraordinary feat in crossing the Atlantic is the forerunner of eventual transpacific air transportation, offers $25,000 to the first flyer and $10,000 to the second flyer to cross from the North American continent to Honolulu in a non-stop flight, within one year after the year beginning August 12, 1927." August 12 had double significance: it was the day of a full moon, and it marked the 27th anniversary of Hawaii becoming a territory of the U.S.

This notice was responsible for one of the most frantic and tragic scrambles for cash and glory in the records of flight. Thirty-three entries were received, but lack of qualifications, financial backing, equipment, and pre-race accidents weeded out most of the candidates. And of those who actually started, more found an unmarked grave in the blue Pacific than fame or fortune.

It was an odd race with a great assortment of pilots and planes, navigators and equipment, officials and onlookers. Just about everything possible went wrong at the start, and the stage was set for disaster from the very beginning. How then did this race come about, what types of planes were entered, who was Dole, and what were his motives?

The incentive to fly to Hawaii was provided by a 49-year-old pineapple farmer, James Drummond Dole, a man of curiosity and integrity, of daring and foresight and wealth, who had become fascinated by the Paris flight of the "Lone Eagle" and saw in aviation the means of linking his adopted home with the mainland of America.

Dole was born in the outskirts of Boston on September 27, 1877, and he received his education at the Roxbury Latin School and Harvard. His father was a minister whose family had been missionaries for years. Back in 1820 a relative had gone as a missionary to Hawaii and close ties had been maintained for years within the families. Young James, having graduated from Harvard in 1899, was encouraged to go out to Hawaii instead of touring Europe. He arrived in Honolulu later the same year and

Crowds gathering at the Oakland, Cal. airport on August 15, 1927 for the start of the race.

was immediately attracted to the Islands—but for economic rather than clergical reasons. He acquired vast acres of good farmland and organized the Hawaiian Pineapple Co. The company prospered and later Dole became one of the great industrial pioneers of the Pacific.

Always in the back of James Dole's mind, as his holdings grew, was the thought of a closer tie between Hawaii and the mainland. When he observed the nationwide interest in Lindbergh's flight in 1927, the idea of an air race from California to Hawaii seemed to be the answer to a promoter's dream.

On June 26, when enthusiasm for the Dole race was just gathering momentum, an event occurred which appeared to put a damper on the whole affair. Two young Army lieutenants, Lester Maitland and Albert Hegenberger, took off from Oakland, Calif., in a Fokker Trimotor named the *Bird of Paradise*, and landed in Honolulu 25 hours and 51 minutes later. The flight was described as a routine test by the Army with no particular significance attached to it. The pilots received simply a note of commendation from their commanding officer.

Dole, however, was undeterred and continued to stir up popular and Press interest in the competitive aspects of his race. To forestall any rash efforts on the part of inexperienced pilots, a Navy technical expert, Lt. Ben Wyatt, was assigned by the Federal Government to establish stringent safety rules and inspect all entries. Dole publicly suported this effort, stating that he wished the race to "cost no brave man either his life or limb . . ." and urged all participants to equip their planes with every possible safety device.

To qualify, each aircraft had to carry a full kit of overwater survival gear, including a liferaft, and a 15% reserve margin of fuel. Standard instrumentation was required; however this meant little more than a magnetic compass and airspeed indicator. A radio was not required. The pilot had to demonstrate, in an actual flight test, his ability to navigate by dead reckoning. As very few of the pilots who entered the race could pass this test, all but one plane was obliged to carry a trained navigator.

As the August 12 date set for departure from Oakland neared, confusion as to problems of qualification reached such a magnitude that a delay of four days had to be granted. The assortment of aircraft that converged on the San Francisco Bay area in midsummer bordered on the fantastic: triplanes, biplanes and monoplanes; homebuilts and commercial models; open seaters and closed cockpits—all plastered with advertisements proclaiming the virtues of their backers' wares.

By August 1 two-thirds of the entries were disqualified and had forfeited their $100 entry fee. Three others were destroyed en route to Oakland. The *Humming Bird*, a low-winged Tremaine monoplane, crashed in a low fog and burned, resulting in the deaths of pilots George Covell and Richard Wagener. The only British pilot, Arthur Rogers, experienced an engine failure in his Bryant monoplane, the *Angel of Los Angeles*, and elected to bail out. He was killed when his parachute failed to open. The only qualified triplane entry, the *Pride of Los Angeles*, backed by cowboy movie star Hoot Gibson, crashed into San Francisco Bay while on approach to Oakland airport. The pilot and navigator swam for their lives, and made it to shore.

On the morning of August 16, eight starters were lined up at the eastern end of the long 7,000 foot runway at Oakland. A race day crowd of 50,000 persons was on hand, fortified with picnic lunches and ample liquid refreshments. Troops and police struggled to keep the aircraft from being crushed by well-wishers. At noon the starter brought down his checkered flag. The Dole Air Derby had begun. The only sound in addition to the noise of the crowd was the full-throttled roar of eight revved-up engines, straining like race horses at the starting gate.

The first to get away was a *Travelair* monoplane, the *Oklahoma*, piloted by Bennett Griffin, who later was to be manager of the Washington National Airport. This entry was sponsored by the Phillips Petroleum Company and named for Bennett's home town. The aircraft were released at 60-second intervals, and the *Oklahoma* had drawn the number one spot. An hour later it was to come limping back with five cylinders blown. The plane landed hard, but safely, and Griffin and his navigator walked away.

The second starter was *El Encanto*, a homebuilt monoplane with a crew of Lts. Goddard (the builder) and Hawkins. As the crowd watched, *Encanto* rose slightly, then fell back on the runway, swaying from side to side, and slewed around to the right, narrowly missing the crowd. Pilot and navigator managed to climb out, but the plane was a total wreck. Miraculously, it did not burn.

Next in the line-up was a Breese monoplane, the *Pabco Pacific Flyer* piloted by Maj. Livingston Irving, the only solo pilot qualified as a navigator. The plane started off and lifted slightly from the runway a few times, but then the pilot gave up and was towed back to the starting point. A little later he tried again but was still overloaded and crashed on the runway, smashing one wing. Scratch one more.

A cigar-shaped Lockheed *Vega*, the *Golden Eagle*, was next, piloted by John Frost with Gordon Scott, navigator. They were sponsored by the San Francisco *Examiner*, and considered one of the favored entries, as no expense had been spared in equipping the plane for the long ordeal.

The only plane carrying a passenger was

The Buhl Air Sedan "Miss Doran" carried three persons, including the lady of that name.

the *Miss Doran*. A Buhl *Airsedan* biplane, its pilot was John Peddlar, navigator, Lt. Vilas Knope, and its passenger, Mildred Doran, was a young sixth-grade teacher from Caro, Michigan, wearing five fraternity pins on her flying suit. After barely getting into the air over the bay, the plane circled, dumped its fuel and landed with engine trouble. On a second try (after an unsuccessful effort to lighten the load by offloading Miss Doran) Peddlar got the plane airborne and flew out to sea.

Taking off next was Martin Jensen in the *Aloha*, another Breese monoplane, with Paul Schluter, a former merchant marine officer, as navigator. This was the only plane backed by Honolulu businessmen. Jensen had no problems getting under way.

The *Woolaroc* was next. Piloted by a movie stunt flyer, Arthur Goebel, with Navy Lt. William Davis as navigator, the plane also was sponsored by the Phillips Petroleum of Oklahoma City and was considered the best equipped in the race. Davis was a Navy pilot on 30 days' leave from his San Diego station. The airplane was a Travelair *Transport* and was named for the wild game preserve consisting of thousands of acres of *wood, lakes* and *rocks* owned by Mr. Phillips. Pilot Goebel had commented "There are but two goals, the Hawaiian Islands or the bottom of the Pacific. . . ."

Last to take off was the *Dallas Spirit*, still another *Travelair* monoplane with Capt. William Erwin, a former Army Air Service captain or pilot, and Alvin Eichwaldt as navigator. The last departure was 12:38 p.m.; half an hour later the *Spirit* came back with the fabric covering peeling off the fuselage. Erwin did not try again.

Out of the thirty-eight entries, eight actually took off from Oakland, but only four were still in flight: Frost in the *Golden Eagle*, Jensen in *Aloha*, Goebel in *Woolaroc* and Peddlar in the *Miss Doran*. The crowd had melted away and a stillness settled over the Oakland Airport. Everything that could be done had been and the National Aeronautics Association notified Honolulu of the airplanes that had left. A flock of news and newsreel planes swarmed after the departing race planes briefly and then they were alone.

Half a dozen merchant ships were stationed along the 2400-mile route to Hawaii, and the Navy was on the alert. But within a few hours the sun was down and the four aircraft were minute specks in the sky over a dark and vast ocean.

In a statement released the following morning James Dole said, "It is my hope . . . that the achievements of the transpacific fliers today point to the early establishment of commercial aviation in Hawaii." This was undoubtedly spoken with a good measure of anxiety and crossed fingers, as an excited nation wondered what would happen to the four planes in the loneliness of the Pacific night.

(The second part of this article will appear in the June issue.)

BRIEFS

CLEARED TO TAXI. A recent FAR amendment (effective April 19, 1978) is designed to eliminate any possible confusion regarding the terms of a clearance to taxi at a controlled airport. The rule change makes it explicit that an air traffic control clearance to "taxi to" an assigned runway, prior to taking off on that runway, does not authorize the aircraft to cross that same runway if it intersects the taxi route. The amendment specifies, however, that an ATC clearance to a point on an airport, other than the takeoff runway (such as "cleared to the ramp") is a clearance to cross all intersecting runways.

TRUTH IN LEASING. Any person or group planning to charter or lease an aircraft should obtain a recently revised FAA publication that explains the difference between a "charter flight" (where the company provides both aircraft and crew and is also responsible for operation and maintenance of the aircraft) and a "lease" (which may cover only the aircraft but can also include the crew and/or maintenance responsibilities, depending on the wording of the lease agreement). A "conditional sales contract" offering yet another arrangement is also explained.

Over the years investigation of some tragic accidents has revealed that individuals did not understand the terms of their agreement, which made them responsible for the airworthiness and operation of the aircraft, or that conditions were deliberately misrepresented in order to evade safety requirements. Request "Truth in Leasing" (AC 91-37A), free from DOT/FAA Distribution Unit, M-443.1, Washington, D. C. 20590.

MOST CRANKSHAFT FAILURES, FAA has determined, are preventable if pilots and mechanics follow approved operating and maintenance procedures which prevent overheating or overstressing the crankshaft. Overheating is frequently caused by the lack of oil, use of worn or contaminated oils, or the failure to pre-oil an engine after a long period of disuse. Overstressing is usually the result of not adhering to the procedures recommended in the pilot's operating handbook. Crankshaft failures due to material or manufacturing defects are of infrequent occurrence. Further details are given in a new FAA Advisory Circular, "Aircraft Engine Crankshaft Failure" (AC 20-103) free from the DOT/FAA Distribution Unit, M-443.1, Washington, D. C. 20590.

CHANNEL SPLITTING. FAA Air Route Traffic Control Centers have begun using 25 kHz-spaced channels (three digits after the point, as 118.275) in addition to those with 50 kHz and 100 kHz spacing when communicating with en route aircraft flying at high altitudes (above 18,000 feet. Aircraft now using the high altitude sectors with en route aircraft flying at high altitudes (above delays, re-routing and other inconveniences. For information on frequency assignments, request "VHF Radio Frequency Assignment Plan for Aeronautical Operations" (AC 90-50B), free from DOT/FAA Distribution Unit, M-443.1, Washington, D. C. 20590.

Pilot Examiners Training

A better understanding of evaluation methods used for flight examinations conducted by FAA pilot examiners is anticipated, as a result of the new refresher course program for examiners. The Designated Pilot Examiners in the United States, who are authorized to test qualified candidates for all pilot certificates and ratings except the original issuance of Instructor's rating are required to attend the course every 24 months as a condition for continued designation.

The three days consist of both lectures and practical demonstrations plus a review of the examiner's basic library, administrative procedures and evaluation techniques and procedures. The schedule calls for a Pilot Examiner Standardization Course to be held in each General Aviation District Office by January 1, 1980, with each examiner attending the course in his District. (In extenuating circumstances arrangements can be made for examiners to attend courses in other locations).

Proposed schedule for the balance of 1978:

July 11	Milwaukee, Wisc.
July 11	Salt Lake City, Utah
July 25	Rochester, New York
July 25	Kansas City, Kansas
August 8	Harrisburg, Penn.
August 8	Minneapolis, Minn.
August 22	St. Louis, Mo.
August 29	Westfield, Mass.
August 29	Allentown, Pa.
September 12	Portland, Maine
September 12	Farmingdale, New York
September 19	Little Rock, Arkansas
September 19	Van Nuys, Calif.
October 17	L. Beach/Santa Monica
October 17	Baltimore, Md.
October 31	Charlotte/Raliegh, N.C.
October 31	Columbus, Ohio
November 14	Jackson, Miss./Memphis
November 14	Fort Worth, Texas
November 28	Lubbock, Texas
December 12	Honolulu, Hawaii
December 12	El Paso, Texas

TCA Altitude Rules are Amended

An amendment to FAR 91.109 has been issued which will permit ATC to assign aircraft operating under visual flight rules (VFR) altitudes other than those specified in the rule for VFR en route aircraft. This amendment will permit ATC to assign altitudes to VFR pilots within TCAs and TRSAs to provide safe separation of aircraft. The amendment is intended to prevent a potentially unsafe traffic conflict where VFR aircraft are receiving ATC separation.

The rule change adds the words "unless otherwise authorized by ATC" to the end of the introductory paragraph of FAR 91.109. Because FAA felt that a potential safety problem existed, the amendment was adopted immediately (March 16, 1978) without the usual notice and comment period.

New AD Summaries Available

The 1978 Summary of Airworthiness Directives (ADs) is now available for purchase from the FAA Aeronautical Center at Oklahoma City, at prices substantially reduced from the previous edition. Airworthiness Directive Summaries, which contain all current ADs as of the publication date, are updated and reprinted on a two-year cycle. Purchase of a Summary includes biweekly supplements for a two-year period, beginning with the date of publication (January of even-numbered years), *not* the date of purchase. New subscribers should request supplements since January; old subscribers will already have these on file.

NOTE: Registered aircraft owners—whether AD subscribers or not—automatically receive all ADs that are known to be pertinent to their aircraft at the time of issue; owners should make sure their address is correct with FAA Aircraft Registery, P. O. Box 25504, Oklahoma City, OK 73125.

Summaries are published and sold separately for large and small aircraft as follows:

"Volume I Summary of Airworthiness Directives—Small Aircraft" (12,500 pounds or less), price $12.50 ($15.65 foreign).

"Volume II Summary of Airworthiness Directives—Large Aircraft" (more than 12,500 pounds), price $10.75 ($13.45 foreign).

To order, send check or money order to FAA (*not GPO*), identifying volume number and title desired, to: DOT/FAA, Aeronautical Center, Attn: AAC-23, P. O. Box 25461, Oklahoma City, OK 73125.

Fuel Chemical Investigated

FAA is investigating possible safety hazards associated with the use of the chemical *toluene* in aviation fuels. The chemical, which is substituted for tetraethyl lead to maintain octane rating, is reportedly being used (by some, not all, oil companies) in somewhat larger quantities in Grade 100LL gasoline than in other grades, and is suspected of softening or dissolving some plastic components used in certain aircraft fuel systems and engines.

FAA is concerned that leaks might develop in the fuel system, or that the fuel flow could be blocked if a piece of the softened plastic broke loose and became lodged in a critical point of fuel system. So far only one case of failure traceable to toluene in the fuel has been reported—a fuel tank vent pipe made of ethylene vinyl acetate apparently was dissolved by the toluene—but FAA is checking with all manufacturers of general aviation aircraft to see if there is any evidence of similar problems.

The FAA investigation also covers two other chemicals—benzine and xylene—that are used as substitutes for tetraethol lead in some general aviation fuels. If it is found that a safety hazard exists from the use of any of the three chemicals, FAA will take regulatory or other action required to eliminate the hazard.

Landscaping for Noise Control

Strategically placed bands of trees and other vegetation can provide an effective means of noise control around airports, according to a recent FAA advisory circular which summarizes research findings on the subject. Trees both absorb acoustical energy through their leaves, needles, and twigs, and diffuse sound with their trunks and heavier branches.

The publication discusses barrier size (thickness, height and density) for best results; positioning of the screen; surface treatment; atmospheric factors; recommended species and planting patterns; and limitations of noise screens. Also mentioned are the psychological effects of vegetation screens, which often reduce noise complaints—even when actual noise reduction is negligible—by aesthetic improvement, shielding of the noise source, and a partial masking of airport noise by the sounds produced by wind blowing through the trees.

The Airport and Airway Development Act (as amended) authorizes Federal grants for "landscaping for the purpose of diminishing the effect of aircraft noise on any area adjacent to a public airport" including tree and vegetation screens, provided they comply with guidelines in the above advisory circular. Copies of "Airport Landscaping for Noise Control Purposes" (AC 150/5320-14) are available free from DOT/FAA Distribution Unit, M-443.1, Washington, D.C. 20590.

• Aerial Maintenance

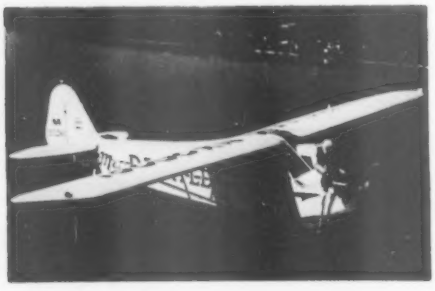
A question was asked in your February issue about the "remarkable spark plug change" that was reportedly accomplished in flight by Fred Key during an endurance flight in 1935 over Mississippi ("Ole Miss," October 1977). As an A & P mechanic, I can tell you that changing the spark plugs while the prop is still windmilling, even with the ignition off, is no different than when it is on. The only logical solution is compression releases mounted on each cylinder.

Being aloft for some 324 hours, he probably wouldn't have changed plugs but once, unless he had problems. By using the compression release he could relieve the majority of the compression, then change the plug. Even then it couldn't have been easy!

Steve Hall
Benoit, Miss.

Thanks for the insight. See photo below for another case of inflight spark plug maintenance, also performed during an endurance flight, this one in 1938. Merrill Phoenix is shown leaning out of the cockpit while Harold Allen flies the 50 h.p. Franklin-powered Cub *over Syracuse. It was, incidentally, the spark plugs that caused the flight to end after a little more than 106 hours.*

The article on the Key Brothers—and their reported inflight spark plug change—has resulted in considerable speculation and theory, but thus far we have not heard from anyone who ever actually accomplished such a feat in the air. If any of our readers has done it, we'd appreciate hearing about it.



• Synthetic Oils

There has been much publicity about some new automotive oils made of synthetic materials. These "oils" are claimed (by their producers) to provide better lubricating qualities, less friction and decreased fuel requirements. Are there any such "oils" for aviation use? I would also like to know why you can't use automotive oils for aircraft engines?.

M. S. Jennings
Memphis, Tenn.

The engine manufacturer is required to specify oils that are acceptable for a given engine. Oils that fail to meet this specification should not be used. We know of no synthetic oils that are approved for aviation use in reciprocating engines. As for automotive oils, they should not be used in aircraft engines because they could cause serious damage to the engine. There are significant differences in the way automotive and aviation oils are compounded.

• Aid for Canada-bound Pilots

Your November/December issue contains a plea from a reader for more travel articles. We'll gladly answer requests for flying information into all parts of Canada at no charge.

Bill Peppler
Canadian Owners and
Pilots Association
Box 723
Ottawa, Canada K1P 5S4

• Transiting a Traffic Area

Could you please answer the following question: If you are a VFR pilot and you are getting radar advisories as you penetrate an airport traffic area, do you still have to contact the tower for approval to enter the traffic area?

Name withheld

Negative. In FAR 91.87 (b)—which requires pilots to be in radio communication with the control tower of an airport in order to operate within the traffic area of that airport—the term "control tower" refers to the "control tower facility", which includes approach control, departure control, etc. Radar operators who are giving traffic advisories to VFR aircraft coordinate this information with the local controller at the tower. AIM Part 1 is being changed to state that authorization to operate in an airport traffic area may be received "either directly from the controlling ATC facility or via relay thru a radar facility from which the pilot is receiving radar traffic advisories.

• Balloon Ratings and Reviews

In the February Forum you say "A Commercial Pilot with Balloon Rating can give a biennial flight review to a Balloon pilot." Didn't you mean that a Commercial Balloon Pilot can give the review? As I read the regs, an airplane rated Commercial Pilot with Private Privileges in balloons cannot give reviews. I have a commercial pilot certificate for lighter-than-air free balloons and I have private privileges in airplane, single-engine land, also instrument rating, airplane. It is my understanding that I can give biennial flight reviews to balloonists.

Another question: Can a balloon be flown IFR? If so, what ratings are required?

Your magazine is very informative. You sure don't make many mistakes, and when you do they are usually of small consequence.

Ted Farrell
Inglewood, Cal.

It is true that the privileges of your Commercial pilot certificate must apply to your balloon rating in order for you to administer a Biennial Flight Review in a balloon. (For airplanes, of course, BFRs are given by Certified Flight Instructors). Regarding IFR in balloons, there are at present no balloons that are certificated for instrument flight.

• Question from a Swiss Pilot

I live in Switzerland and hold current Swiss private and commercial single- and multi-engine licenses. I also hold a Swiss IFR license (not part of the above) which is kept current by a government instrument flight check every six months.

In order to fly U.S. registered aircraft I had my commercial validated at the FAA office in Frankfurt, and for my IFR I had to pass a written test on FAR 61, 91 and related procedures. My U.S. license now reads "Airplane, Single and Multiengine Land, Instrument Airplane. Issued on basis of Swiss Pilot License 1811. Not valid for the carriage of persons or property for compensation or hire."

I would like to know exactly what this means. Is my U.S. license valid as long as Swiss License #1811 is valid? (My Swiss license #1811 requires only 50 hours of VFR per year.) What would I need to do to get the restriction lifted from my U.S. license?

Felix Voirol
Switzerland

Your U.S. pilot certificate will remain effective only as long as your Swiss license remains valid. To obtain an unrestricted U.S. commercial pilot certificate with instrument rating, you are required to take a written and flight test for both the commercial certificate and the instrument rating.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFS-807, Washington, D.C. 20591.

• Solo or Command?

We enjoy your publication. Wonder if you could answer one more question concerning logging time? May a student pilot log as pilot-in-command time the time during which he is the sole manipulator of the controls of an aircraft for which he is signed off for solo—but while accompanied by a certified flight instructor?

James F. Duggan
Toledo, Ohio

A student pilot does not log pilot-in-command time. Student flight time is logged either as solo flight time (if he is alone in the aircraft) or instruction time (if an instructor accompanies him and so signed his logbook.)

• Exhaust as Preheat

I frequently see pilots at Teterboro and other airports using automobile exhaust piped into the airplane engine compartment to preheat engines. This method seems to serve the purpose but I question its advisability, particularly with respect to late model cars—1975 or later—that have catalytic converters.

I've read that the catalytic exhaust system spews forth, amongst other goodies, a certain amount of sulphoric acid, and that is the point of this letter. Couldn't this acid, even in tiny amounts, accumulate and cause harm to wiring, ignition, aluminum parts, rubber, etc. on the engine and other parts under the hood? In the interest of preventive maintenance and flight safety I'd appreciate your comments.

Harry Marr
Maywood, N.J.

You are right about harmful elements existing in the exhausts of cars with catalytic converters, and in certain circumstances—such as when they contact cold metal—they could result in harmful deposits on airplane components. We do not recommend using the exhaust from these automobiles for preheating aircraft engines.

INSTRUMENT CORNER

• Flying Turbulence, IFR

In helping a student to prepare for the FAA Instrument Written Exam, I have found little official reference on flying turbulence. Could you please point me in the direction of information on handling altitude, airspeed and the priorities for each which the FAA suggests?

Lorrain A. Blaham
Groton, Conn.

Try the advisory circular, "Aviation Weather (AC 00-6A), available from Superintendent of Documents, GPO, Washington, D.C. 20402 for $4.55. Also check with your GADO for free accident prevention publications on this subject.

IFR conditions are no different basically than in VFR, except that if you are IFR you would have to discuss altitude, route or air-speed changes with ATC before deviating from your clearance to find smoother air.

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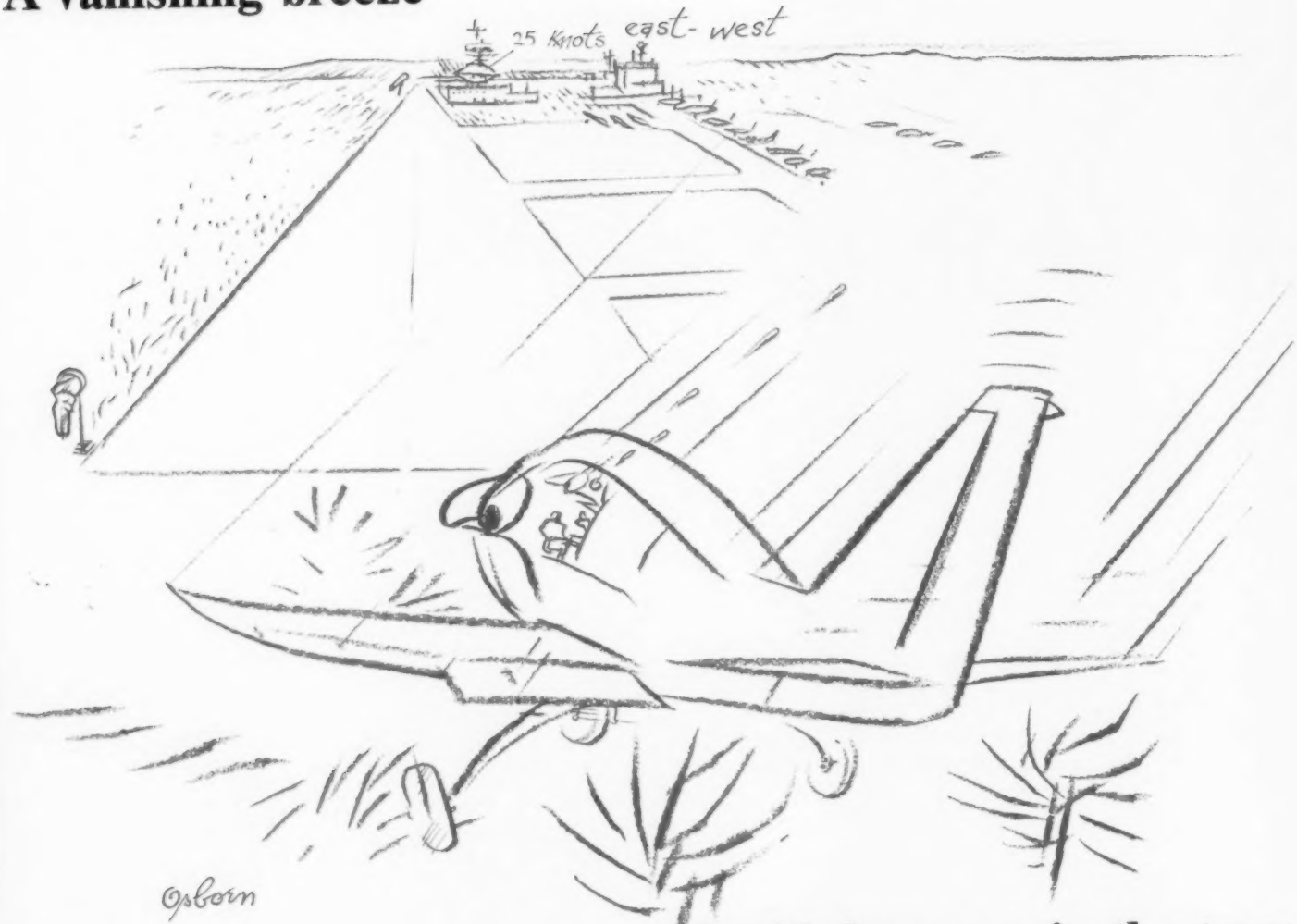

Could drop you in the trees